

Title: PROCESS FOR THE SIMULTANEOUS PRODUCTION  
OF XYLITOL AND ETHANOL  
Appln No.: 07/910,133

REMARKS

IN THE CLAIMS:

Please cancel 14, 17 and 18 without prejudice, and add new claims 19 and 20 in the following manner.

*Sub ES*  
*C1* --19. The process according to claim 1, wherein said lignose-containing material is hydrolyzed by steam explosion.--

--20. The process according to claims 1 or 19, wherein said lignose-containing material is hydrolyzed enzymatically.--

REMARKS

Claim 1, 3-13, 15, 16, 19, and 20 are all of the claims pending in the application. Applicants have canceled claims 17 and 18 without prejudice, and replaced them with new claims 19 and 20, which are supported, for example, on page 6 of the specification. Applicants turn now to address the Examiner's rejections issued in the pending Office Action.

The specification is objected to, in claims 17 and 18 (now 19 and 20) are rejected, under 35 U.S.C. § 112, first paragraph, for a lack of written description. The Examiner states that the specification does not support a claim for partial hydrolysis as in canceled claim 17 and then complete hydrolysis as in canceled claim 18. The Examiner states that the two steps appear to be

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intended to be used together as disclosed on page 6 of the specification and that there is no disclosure on this page of omitting the second step to result in partial hydrolysis nor that the second step could result in complete hydrolysis.

Applicants respectfully traverse. On page 6 of the specification, applicants state that "the hydrolysis can comprise two steps, pre-hydrolysis of the cellulose-containing raw material, which may be effected using the so-called steam explosion method, and the enzymatic hydrolysis of the polysaccharides and oligosaccharides to produce the corresponding monosaccharides." This statement of a two step hydrolysis does not require that both steps take place; applicants only state that "the hydrolysis can comprise the specified two steps. Accordingly, applicants respectfully submit that the Examiner's restriction of the present invention to a particular two step hydrolysis method is erroneous.

In addition, applicants replaced claims 17 and 18 with new claims 19 and 20. While claim 11(which is dependent on claim 2) recites that the hydrolysis is carried out by steam explosion and enzymatic hydrolysis, claims 19 and 20 break the two steps apart and are dependent on claim 1. Accordingly, applicants respectfully submit that claims 19 and 20 are adequately described in the specification and request that the 25 U.S.C. § 112, first paragraph, rejection one withdrawn.

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On pages 2-3 of the Office Action, the Examiner issued 35 U.S.C. § 112, second paragraph rejections, for indefiniteness. Applicants respectfully submit that the cancellation without prejudice of claims 14, 18, and 19, and the addition of new claims 19 and 20 obviate these basis of rejections.

On pages 3-5 of the Office Action, claims 1 and 3-18 are rejected as being anticipated by, or obvious over Heikkilä et al (U.S. Patent No. 5,081,026). In addition, the Examiner rejects claims 1 and 3-18 under the doctrine of obviousness type double patenting as being unpatentable over claims 1-28 of the '026 patent. Applicants respectfully submit that an obviousness type double patenting rejection can only be made where the cited reference is not prior art to the present invention. That is, one cannot reject the claim as being unpatentable over U.S. Patent and at the same time also issue an obviousness type double patenting rejection over the same U.S. Patent because these types of rejections are mutually exclusive. Accordingly, applicants respectfully request that the Examiner withdraw one or both basis of rejection for this and because the presently claimed invention is neither taught nor suggested by the '026 patent. Applicants provide below a brief outline of these distinctions.

The goal in the '026 patent is to make xylitol by using yeast for reduction of xylose to xylitol and to avoid extensive

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purifications (e.g. ion exchange) needed for the catalytic hydrogenation of xylose to xylitol.

In contrast, the present application is directed to using biomass as efficiently as possible by converting xylose/xylan to xylitol and hexoses/cellulose or other hemicellulose to ethanol. This allows for the recovery of two products: xylitol and ethanol from these raw materials.

Since the presently claimed process allows for the production of two products, it makes a more efficient use of the starting materials, as well as producing less residual fractions. These issues become even more important when assessing the viability of such a process on an industrial scale. In addition, the presently claimed process allows production of high purity xylitol and ethanol.

In contrast, the '026 patent does not teach or suggest obtaining two products, nor is there any evidence that if the hydrolysis of all monosaccharides including hexoses is high or complete, xylitol can be recovered by the '026 patent process. Moreover, the '026 patent does not teach or suggest that if fermentation of "total hydrolyzate" is performed, that high yield of ethanol is produced and that xylitol also can be recovered by the process of the patent.

Accordingly, applicants respectfully submit that the presently claimed invention is not anticipated by nor obvious

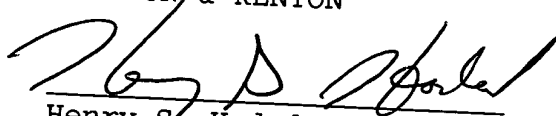
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over the cited references and fully meets the requirements of 35  
U.S.C. § 112. Accordingly, applicants request that this case be  
passed to issuance.

Any inquiry concerning this submission should be directed to  
the undersigned at the telephone number listed below.

Respectfully Submitted,

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